REMARKS

This is in response to the Office Action dated May 8, 2002, for which a response is due August 8, 2002.

Claims 25-45 were rejected under 35 USC 112 on the basis of indefiniteness for a number of reasons.

With respect to Claim 25, it was stated that it was not clearly understood how the elements N placed in the path of a second laser are each adapted to impose a phase delay.

Claim 25 has been amended to further enhance clarity by stating that each of the laser emitter pairs have first and second laser emitting at first and second respective frequencies. The device further comprises phase delay elements, where such phase delay elements are placed in the path of a second laser emitter whereby the phase delay is imposed on the beam of the second laser emitter.

Claim 25 was deemed to be indefinite on the basis that it was unclear what constitutes a frequency-wise manner and a phase-wise manner.

Claim 25 has been amended to further enhance clarity by defining that the system further comprises means for slaving each said laser emitter pair in a frequency and phase manner, or in a frequency, phase, and amplitude manner.

In the Office Action it was stated that Claim 25 was indefinite on the basis of the use of the term amplitude-wise manner. The aforesaid amendment to Claim 25 has addressed this.

Claim 25 was also deemed to be indefinite on the basis that it was not clear that the N elements are capable of imposing phase delay. The aforesaid

amendments to Claim 25 with respect to the interaction between the phase delay elements and the beam emitted by the second laser emitter has addressed this.

In the Office Action it is stated that Claims 25 and 32, are indefinite on the basis of the definition of ω_1 and ω_2 and the suggestion that such gives rise to ultrahigh frequency as recited in the preamble. It was suggested in the Office Action that ultrahigh frequency be deleted from the recitation. This has been done.

In the Office Action it was said in Claim 28 it is unclear how the beat signals and emission frequency of the laser emitter pairs interact. Claim 28 has been amended to recite that the frequency slaving means comprises means for forming a beat signal from the beams emitted by the first and second laser emitters, and further the emission frequency of one of the first and second laser emitters is adjusted according to the beat signal. It is respectively submitted that those skilled in the art will understand the formation of beat signal and that means for same are available.

Claim 30 was rejected under 112 on the basis that the source recited therein was not definitely recited to be the same source as Claim 29 from which it depends. This has been corrected.

Claim 31 was rejected on the basis that the recitation to an array lacks antecedent basis. This has been corrected by deletion of such recitation. Claim 31 was also rejected on the basis of the term "another beam." However, Claim 31 recites means for slaving the phase delay according to a beat signal between an earlier recited beam which passes through the phase delay element and another beam. It is respectfully submitted that the plain meaning of the recitation of "another beam" in the context of Claim 31 is self-evident.

Claims 37-45 are dependent claims, depending directly or indirectly on Claim 25. In the Office Action it was stated that it was not clear how the structure of such claims constitute a radar device and required support be provided regarding same.

Claims 37-45 being dependent on Claim 25, thereby incorporate all of the earlier recited features of Claim 25. In Claim 37 for example, clarity has been added to state that the aforesaid first and second laser emitters of Claim 25 are assembled in an array and there is provided a transmission by optical fibers between the phase delay elements and means for mixing the emitted beams. This is supported in the specification at least at pages 23 et. seq. For example, it is described that Figure 10 shows schematically a radar system based upon the optical frequency routes earlier described in the specification, implemented in array form. The device further comprises means for coupling fibers conveying pumping beams issuing from an array of pumping diodes, where such pumping beams are next directed to an array of chip lasers provided with amplitude modulation means and means for acting on the phase and/or amplitude slaving of the chip laser, such components as already having been described further above in the specification. There is further described phase and/or amplifying set points regulated by beat signals from the diodes situated either on a path of the laser beams, upstream of the optical fibers, or at the end of the chain, the slaving means then being merged with antenna diodes of the array. Thereby it is possible to accommodate phase delay connected with the fibers. The beat signal is sent back to slaving means of the array and in the alternative case can be sent back by the fibers or by separate optical fibers. Thus, optical fibers make it possible to transport the modulated beams to an array of photodiodes which have mixing beam function. Figure

10 further shows an array of active antennas provided with suitable electronic amplification. Amplitude adjustment, amplitude modulation are conventional. Continuing to page 25 it is further described that Figure 10 shows the overall structure of an active antenna radar operation using the aforesaid features with the phase and/or amplitude modulation or control means situated upstream of the optical fiber transportation of the ultrahigh frequency signals. In another embodiment, as further depicted in Figure 10, they can be positioned in a distributed fashion between the upstream and the downstream of the fiber network, with components and features acting on phase amplitude and set points being as described earlier hereinabove. In that regard, each of Claims 37, 38, 40, 41, 42, 43 and 45 have been amended to more clearly define the earlier recited features and their combination to provide the aforesaid radar device, and which read in light of the specification, are submitted to be readily understood to one skilled in the art.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the

Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and brackets indicate deletions.

25. (Amended) [An ultrahigh] A frequency emitting device, having a plurality of [N] laser emitter pairs, each of said laser emitter pairs having a first and a second laser emitter emitting at a first and a second frequency ω_1, ω_2, respectively, [which are] ω_1 and ω_2 being different; a number of [N] phase delay elements, each being placed in the path of said second laser emitter of one of said laser emitter pairs, and each said phase delay element adapted to impose a phase delay on the beam of said second laser emitter; means for slaving each said laser emitter pair[,] in one of a frequency and phase manner, and a frequency, phase, and amplitude manner [a frequency-wise manner and phase-wise manner, and optionally in an amplitude-wise manner]; a number of [N] means for mixing each of the beams emitted by said first emitters with each of the beams emitted by said second emitters, and delayed by said phase delay elements thereby imposing a phase delay, and producing a number of [N] signals at the frequency ω_1,-ω_2; and a number of [N] antenna-forming means for emitting radiation at the frequency ω_1,-ω_2.

27. (Amended) The device of claim 25, wherein said phase delay elements imposing a phase delay are selected from the group consisting of electro-optical, magneto-optical, and thermo-optical elements.

28. (Amended) The device of claim 25, wherein said frequency slaving means comprises means for forming a beat signal from the beams emitted by said first and second [lasers] laser emitters of each said laser emitter pair, and means for adjusting the emission frequency of one of said first and second laser emitters of said laser emitter pair according to the beat signal.

29. (Amended) The device of claim 28, wherein said means for adjusting the emission frequency comprises means for comparing the beat signal to a reference signal provided by a reference source, and means for modifying an optical length of a cavity of said one of said first and second laser [emitter] emitters for emission frequency adjustment.

30. (Amended) The device of claim 29, wherein said reference source is common to all [the] of said laser emitter pairs.

31. (Amended) The device of claim 25, which further comprises means for slaving said phase delay according to a beat signal between the beam which passes through said phase delay element [of the array] and another beam.

32. (Amended) [An ultrahigh] A frequency emitting device, having a plurality of [N] laser emitter pairs, each said laser emitter pair having a first and a second laser emitter emitting at a first and a second frequency ω_1, ω_2 [which are] ω_1, ω_2 being different; means for frequency slaving each said laser emitter pair [in a frequency-wise manner]; means for modifying the frequency of one of said laser emitter of at least one of said laser emitter pairs with respect to the frequency of the other laser emitter of said laser emitter pair; a number of [N] means for mixing each of the beams emitted by said first emitters with each of the beams emitted by said second emitters, and for producing a signal at the frequency ω_1,-ω_2; a number of [N] antenna-forming means for emitting radiation at the frequency ω_1,-ω_2.

34. (Amended) The device of claim 32, wherein said first and second laser emitters of each pair are constituted by a dual frequency source, emitting at the respective frequencies ω_1 and ω_2.

37. (Amended) A radar device having [an ultrahigh] a frequency emitting device as in claim 25, with said first and second laser emitters being assembled in an array, a [coupling or] transmission by optical fibers being implemented between [the] said phase delay elements, [thereby imposing phase delays,] and means for mixing the emitted beams.

38. (Amended) A radar device having [an ultrahigh] a frequency emitting device as in claim 25, with said first and second laser emitters being assembled in an array and multiplexed by a multiplexer, an optical fiber connecting the multiplexer and a demultiplexer.

40. (Amended) The radar device of claim 37, wherein said frequency slaving means comprises means for forming a beat signal from the beams emitted by said first and second [lasers] laser emitters of each said laser emitter pair, and means for adjusting the emission frequency of one of said first and second laser emitters of said laser emitter pair according to the beat signal, said beat signal forming means being merged with said means for mixing [either] one of the beam emitted by the first laser [and] emitter with each of the [N] delayed beams, or each of the beams emitted by said first laser emitters[,] with each of the beams emitted by said second laser emitters and delayed by the phase delay elements [making it possible] to impose a phase delay.

41. (Amended) The device of claim 38, wherein each said first and second laser [emitter] emitters has a cavity and wherein said cavities of said first and second laser emitters are frequency shifted [frequency-wise] with respect to one another.

42. (Amended) The device of claim 41, wherein said cavities are frequency shifted [frequency-wise] by a length adjustment [of their length].

43. (Amended) The device of claim 42, wherein each said [laser] cavity is associated with a Bragg grating type mirror, implemented on a corresponding guide of said multiplexer.

45. (Amended) The radar device of claim 38, wherein said frequency slaving means comprises means for forming a beat signal from the beams emitted by said first and second [lasers] laser emitters of each said laser emitter pair, and means for adjusting the emission frequency of one of said first and second laser emitters of said laser emitter pair according to the beat signal, said beat signal forming means being merged with said means for mixing [either] are of the beam emitted by the first laser [and] emitter with each of the [N] delayed beams, or each of the beams emitted by said first laser emitters[,] with each of the beams emitted by said second laser emitters and delayed by the phase delay elements [making it possible] to impose a phase delay.